WHAT IS CLAIMED IS:

1. A dielectric separation type semiconductor device, comprising:

a semiconductor substrate;

a primary dielectric layer disposed adjacent to a whole region of a first main surface of said semiconductor substrate;

a first conductivity type first semiconductor layer of a low impurity concentration disposed on a surface of said primary dielectric layer in opposition to said semiconductor substrate so that said primary dielectric layer is sandwiched between said first conductivity type first semiconductor layer and said semiconductor substrate;

a first conductivity type second semiconductor layer of a high impurity concentration formed selectively on the surface of said first semiconductor layer;

a second conductivity type third semiconductor layer of a high impurity concentration disposed so as to surround an outer peripheral edge of said first semiconductor layer with a distance;

a ring-like insulation film disposed so as to surround an outer peripheral edge of said third semiconductor layer;

a first main electrode disposed in contact with a surface of said second semiconductor layer;

a second main electrode disposed in contact with a surface of said third semiconductor layer;

a sheet-like back-surface electrode disposed adjacent to a second main surface of said semiconductor substrate on a side opposite to said first main surface of said semiconductor substrate; and

a first auxiliary dielectric layer disposed immediately below said second semiconductor layer and having at least a portion junctioned to a second main surface of said primary dielectric layer.

2. A dielectric separation type semiconductor device according to claim 1,

wherein said first auxiliary dielectric layer is so disposed that one end thereof is located at a position corresponding to said first main electrode and extends over a region of a size not smaller than 40 % of a distance between said first main electrode and said second main electrode.

3. A dielectric separation type semiconductor device according to claim 1,

wherein said first auxiliary dielectric layer is shaped in a cylindrical form having a bottom and junctioned to both of said semiconductor substrate and said primary dielectric layer.

4. A dielectric separation type semiconductor device according to claim 3,

wherein said first auxiliary dielectric layer is shaped

in a bowl-like form.

5. A dielectric separation type semiconductor device according to claim 1,

wherein a second auxiliary dielectric layer is disposed between said first auxiliary dielectric layer and said primary dielectric layer.

6. A dielectric separation type semiconductor device according to claim 5,

wherein said second auxiliary dielectric layer is formed by a thermally nitrided film or alternatively by a CVD nitride film.

7. A dielectric separation type semiconductor device according to claim 1,

wherein said semiconductor substrate includes a p-type semiconductor region formed integrally with said semiconductor substrate.

8. A method of manufacturing a dielectric separation type semiconductor device in the form of a high-voltage-rated lateral array type semiconductor device implemented in a dielectric-isolated substrate and having a first main electrode and a second main electrode which is formed so as to surround said first main electrode and including a semiconductor substrate disposed on a back surface side

of said dielectric-isolated substrate to serve as a pedestal (base), comprising the steps of:

removing said semiconductor substrate by etching with KOH within a region which covers said first main electrode and extends over an area of a size not smaller than 40 % of a distance between said first main electrode and said second main electrode;

forming a first buried insulation film in said region; and

forming a second buried insulation film immediately beneath said first buried insulation film in contact therewith.

9. A method of manufacturing a dielectric separation type semiconductor device according to claim 8,

wherein said second buried insulation film is formed by a cured film of at least one curable polymer selected from a group which consists of silicone series polymer, polyimide series polymer, polyimide silicone series polymer, polyallylene ether series polymer, bis-benzo-cyclobutene series polymer, polychinoline series polymer, perfluoro hydrocarbon series polymer, fluorocarbon series polymer, aromatic hydrocarbon series polymer, borazine series polymer, and halides or deuterides of said individual polymers.

10. A method of manufacturing a dielectric separation type semiconductor device according to claim 8,

wherein said second buried insulation film is formed by

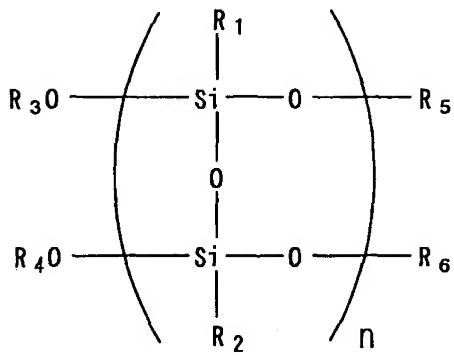
a cured film of a silicone series polymer represented by a general formula (1) mentioned below:

$$[Si(O_{1/2})_4]_k \cdot [R^1Si(O_{1/2})_3]_l \cdot [R^2R^3Si(O_{1/2})_2]_m \cdot [R^4R^5R^6SiO_{1/2}]_n \quad \ldots (1)$$

where R^1, R^2, R^3, R^4, R^5 and R^6 represent same or different aryl group, hydrogen group, aliphatic series alkyl group, trialkylsilyl group, deuterium group, deuteroalkyl group, fluorine group, fluoro-alkyl group or functional group having unsaturated bond, $\underline{k}$, $\underline{l}$, $\underline{m}$ and $\underline{n}$ represent integers each greater than 0 (zero), and "$2k + (3/2)l + m + (1/2)n$" representing a natural number, and where mean molecular weight of each polymer is greater than "50" inclusive, and molecular terminal groups are same or different aryl group, hydrogen group, aliphatic series alkyl group, hydroxyl group, trialkylsilyl group, deuterium group, deuteroalkyl group, fluorine group, fluoro-alkyl group or functional group having unsaturated bond.

11. A method of manufacturing a dielectric separation type semiconductor device according to claim 8,

wherein said second buried insulation film is formed by a cured film of a silicone series polymer having a ladder-like structure which is represented by a general formula (2) mentioned below:



· · · (2)

where R_1 and R_2 represent same or different aryl group, hydrogen group, aliphatic series alkyl group, hydroxyl group, deuterium group, deuteroalkyl group, fluorine group, fluoro-alkyl group or functional group having unsaturated bond, R_3, R_4, R_5 and R_6 represent same or different hydrogen group, aryl group, aliphatic series alkyl group, trialkylsilyl group, hydroxyl group, deuterium group, deuteroalkyl group, fluorine group, fluoro-alkyl group or functional group having unsaturated bond, and where $\underline{n}$ represents an integer, and mean molecular weight of each polymer is greater than "50" inclusive.

12. A method of manufacturing a dielectric separation type semiconductor device according to claim 8,

wherein said second buried insulation film contains vanish or alternatively resin and is formed over a whole region of said dielectric-isolated substrate or alternatively formed selectively on said dielectric-isolated substrate through an application process selected from a group consisting of a rotor application process, a splay application process with micro-splay jets and a scan application process with a micro-nozzle.

13. A method of manufacturing a dielectric separation type semiconductor device according to claim 12,

wherein said second buried insulation layer is formed by applying a first varnish prepared by PVSQ of 150 k in molecular weight solved in an anisole solution of 10 wt % and a second varnish prepared by PVSQ of 150 k in molecular weight solved in an anisole solution of 15 wt % sequentially at 100 rpm for 5 seconds, 300 rpm for 10 seconds and 500 rpm for 60 seconds, respectively, and

wherein after said application process, a curing process is carried out by gradual cooling at a temperature of 350 ° C for at least one hour.

14. A method of manufacturing a dielectric separation type semiconductor device according to claim 8,

further comprising the steps of:

forming a crystallinity-destructed silicon layer after formation of said second buried insulation film, and

removing partially said dielectric-isolated substrate by making use of said crystallinity-destructed silicon layer as a delaminatable layer.

15. A method of manufacturing a dielectric separation type semiconductor device according to claim 14,

wherein said crystallinity-destructed silicon layer is

formed by a porous silicon layer.